BONARES

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BONARES Status Seminar

17th – 19th February 2020

Leipziger KUBUS, Permoserstr. 15, 04318 Leipzig

Please note: At events organised by the BonaRes Centre photos might be taken or films shot, members of the press might attend, lectures might be transferred via Skype, there might be video conferences or live streamings with or without recording. Upon request we will gladly provide you with more details, or you contact us on-site during the event.

MONDAY, 17th February 2020

Morning Programme

08:00 Registration opens (Foyer)
08:30 – 12:00 Early Career Workshop (Hall 1CD)
10:00 – 12:00 Scientific Board Meeting (Hall 2AB)

12:00 – 13:30 **Lunch Break** (Foyer)

Afternoon Programme

13:30 – 13:40 **Welcome Addresses** (Hall 1AB)
Chair: Prof. Katharina Helming
Welcome address by PD Dr. Klaus-Peter Michel (BMBF)
Welcome address by Prof. Hans-Jörg Vogel (BonaRes Centre)

13:40 – 15:00 **Highlight Presentations BonaRes Projects 1** (Hall 1AB)
Chair: Prof. Katharina Helming

13:40 – 14:00 Soil³: Managing carbon in agricultural soils: a synthesis of German long-term field experiments
Dr. Martina I. Gocke (University of Bonn)

14:00 – 14:20 SIGNAL: Sustainable intensification of agriculture through agroforestry
Dr. Marcus Schmidt (University of Göttingen)

14:20 – 14:40 Susalps: Ecosystem services of prealpine grasslands: Stakeholders' preferences and bio-economic modelling
Prof. Dr. Thomas Koellner (University of Bayreuth)

14:40 – 15:00 DiControl: Experimental approach for field evaluation of root exudate microbiome interactions in winter wheat depending on long-term agricultural management
Moradtalab Narges (Leibniz Institute of Vegetable and Ornamental Crops (IGZ) Großbeeren)

15:00 – 15:30 **Coffee Break** (Foyer)

15:30 – 16:00 **Poster Elevator Pitches 1** (Hall 1AB) – see Monday's poster list below for details
Chair: Dr. Stephan Bartke

Nutrient Cycling: Diana R. Andrade-Linares, Xenia Bischel, Dymphie Burger, Hao Chen, Akane Chiba, Michael Dannenmann, Jie Luo, Sabine Seidel, Max A. Schuchardt
Biological controls on soil functions: Hayyan Alyusf, Doreen Babin, Sarah Benning, Soumitra Paul Chowdhury, Kristin Hauschild, Susanne Horka
Farmers' perceptions, socio-economic assessment and governance of soil functions: Alevtina Evgrafova, Sophie Ittner, Sandra Ledermüller, Carsten Paul, Thomas Schmitt

16:00 – 18:00 **Poster Session 1** (Foyer) – see Monday's poster list below for details

18.00 – 19:30 **Public Plenary Discussion:** "Ohne Boden nix los! Warum gesunde Böden für uns alle wichtig sind" **as part of the Scientific Year 2020 "Bioeconomy (in German)**
(Hall 1AB)

Auf dem Podium diskutieren zwei Journalisten und Buchautoren:
Dr. Susanne Dohrn ("Der Boden. Bedrohter Helfer gegen den Klimawandel") und
Florian Schwinn („Rettet den Boden. Warum wir um das Leben unter unseren Füßen kämpfen müssen")
und vier BonaRes Wissenschaftlerinnen und Wissenschaftler:
Prof. Dr. Nicolas Brüggemann
Prof. Dr. Bärberl Gerowitt
Prof. Dr. Ingrid Kögel-Knabner
Dr. David Russell

Moderation: Hanna Gersmann

Gesunde Böden sind wahre Alleskönner. Sie spielen eine Schlüsselrolle beim Klimaschutz, für sauberes Wasser und für die biologische Vielfalt. Fruchtbare Böden sind darüber hinaus die Basis für die Produktion von Nahrungs- und Futtermitteln sowie die Erzeugung nachwachsender Rohstoffe in einer umweltverträglichen Landwirtschaft.

Je besser die Böden sind, umso mehr Wasser und Nährstoffe können sie speichern und langsam an die Pflanzen abgeben. Gesunde Böden sind als Speicher von organischem Kohlenstoff ein zentraler Baustein für den Klimaschutz, und hier wird tote organische Substanz zerlegt und für neues Wachstum verfügbar gemacht. Bewerkstelligt wird dies von einer enormen Zahl von Lebewesen, von denen es in einer Hand voll Boden mehr gibt als Menschen auf der Erde. Diese verschiedenen Bodenfunktionen sind die Basis für den Erhalt unserer terrestrischen Ökosysteme.

Die stetig steigende Weltbevölkerung und der zunehmende Bedarf an pflanzlicher Biomasse für Industrie und Energiegewinnung stellt Böden, Landwirtschaft und Forschung vor große Herausforderungen. Damit der Boden auch in Zukunft alle seine Funktionen gleichzeitig erfüllen kann, brauchen wir tiefgreifende Kenntnisse über das System Boden und ein sehr umsichtiges Management.

Was wissen wir bereits über die Bedeutung der Böden für Mensch und Umwelt? Wo besteht noch Forschungsbedarf und wo liegen die Zielkonflikte, die sich nachteilig auf den Bodenzustand auswirken, im Angesicht aktueller gesellschaftlicher und umweltpolitischer Entwicklungen?

Über diese und ähnliche Fragen werden BonaRes-Wissenschaftlerinnen und Wissenschaftler mit zwei Sachbuchautor*innen diskutieren und die Bedeutung der Böden für die Erhaltung unseres Ökosystems aufzeigen.

Posters MONDAY, 17th February 2020

*Participant BonaRes Early Career Award

Nutrient Cycling		
1	Quantum chemical modeling of the P-binding at the soil mineral surfaces	Ashour A. Ahmed, Oliver Kühn
2	Changes in microbial network structures as a result of climate change and land management in pre-alpine grassland soils	Diana R. Andrade-Linares et al.
3	Redox-induced mobilization and speciation of phosphorus in arable soils	Karen Baumann et al.
4	Leaf chemistry and productivity of sub-alpine grasslands after exposure to climate and management intensity changes	Bernd Berauer et al.
5	Changes in nutrient response efficiencies in agroforestry and monoculture croplands with reduced fertilization	Xenia Bischel
6	Comparability of the Calcium-Acetate-Lactate and Double-Lactate extraction methods to assess soil phosphorus fertility	Uwe Buczko et al.
7	*30 years of topsoil formation from subsoil: C storage in a long term field experiment at ZALF	Dymphie Burger
8	*Reducing soil N leaching loses by manipulating microbial stoichiometry with the addition of organic amendments and nitrification inhibitor	Hao Chen
9	*Earthworm-induced bacterial P mobilization by copiotrophic bacteria plays a central role in P turnover in subsoil horizons	Akane Chiba et al.
10	Intensive slurry management and climate change promote nitrogen mining from humus-rich montane grassland soils	Michael Dannenmann et al.
11	Mobilization of P from crystalline and amorphous Fe- and Al-hydroxides	Stella Gypser, Dirk Freese
12	Flux fields affect the spatial distribution of phosphorus in a tilled loamy soil	Stefan Koch, Bernd Lennartz
13	Gross N2O emission and gross N2O uptake under cropland agroforestry and monoculture systems	Jie Luo
14	Five years of consecutive application of bone char as phosphorus fertiliser - Evaluation of crop response depending on the initial phosphorus status of soil	Kerstin Panten, Peter Leinweber
15	Soil nitrous oxide emission as function of C:N:P stoichiometry	Rüdiger Reichel et al.
16	How crop sensors can contribute to a more accurate N balance on the field scale	Pablo Rosso, Evelyn Wallor
17	*Optimized Nitrogen Use Efficiency by increased N immobilization	Rothardt et al.
18	Rooting pattern of cereal crops > 50 years after deep-ploughing	Florian Schneider et al.
19	*Phenological responses in a changing climate	Max A. Schuchardt et al.
20	Modelling crop growth and soil organic carbon, nitrogen and phosphorus at the long-term fertilizer experiment Dikopshof	Sabine Seidel
21	Soil CO2, N2O and CH4 fluxes from cropland agroforestry and monoculture systems	Guodong Shao et al.
22	*Tree and management effects on the litter formation in the grassland component of a temperate agroforestry system	R. Sutterlütti et al.
23	Distribution and nutrient content of poplar fine roots in an agroforestry crop alley in Northern Germany	Anita Swieter et al.
24	*A tale of three non-traditional stable isotope systems: the good, the bad and the ugly	David Uhlig et al.
25	How crop models can contribute to a more accurate N balance at the field scale	Evelyn Wallor et al.

26	N carry-over potential of different catch crops to subsequently grown maize	Diana Heuermann et al.

Biological controls on soil functions		
27	-* no title specified-	Hayyan Alyusf
28	Does the tillage-shaped soil microbiome influence the assembly of the rhizomicrobiota and interactions with the plant?	Doreen Babin
29	*Assessing plant growth promoting activity of Actinomycetes strains to improve apple tree growth in replant diseased soils	Sarah Benning
30	Shifts in soil microbial community in agroforestry systems are linked to higher organic carbon concentration in top soils under trees	Katharina Giray et al.
31	Colonization of apple rhizosphere by the plant beneficial Pseudomonas sp. RU47	Kristin Hauschild
32	*How to investigate spatial variation of ARD in soil?	Susanne Horka
33	Response of subsoil organic matter amendment on microbial denitrification genes	Jaiswal Sanjay
34	*Silicon strengthens apple roots in replant diseased soil	Jiem Krüger et al.
35	Metabolic profiling and MALDI-HRMS-imaging of apple root associated Streptomyces pulveraceus ES16 and Streptomyces ciscaucasicus GS2 to evaluate their chemodiversity and biocontrol potential	Souvik Kusari et al.
36	*Bacterial endophytes in M26 apple rootstocks growing in replant or non-replant soils	Felix Mahnkopp-Dirks et al.
37	Apple Replant Disease: the role of endophytic bacteria and inoculation with microorganisms from sick soils	Nils Orth
38	Long-term fertilization strategies influence defense reactions in lettuce plants towards the pathogen Rhizoctonia solani	Soumitra Paul Chowdhury et al.
39	Studies on Biotic Factors in Root Systems of Apple Plants associated with Replant Disease	Tom Pascal Pielhop, Edgar Maiß
40	*Impact of clay amendment to soils with apple replant disease on carbon speciation in the rhizosphere	Jessica Schimmel et al.
41	Cover crop root channels as a strategy for improved access to nutrient and water uptake from subsoil	Tobias Stürzebecher
42	An unexplored dimension of agricultural productivity: Plant-soil feedback effects	Amit Kumar, Vicky M. Temperton

Farmers' perceptions, socio-economic assessment and governance of soil functions		
43	MIRBAP: Using Models to Implement Result-Based Agri-Environmental Payments	Bartosz Bartkowski et al.
44	*German Farmers attitude towards agroforestry systems: A descriptive analysis	Maximilian Deutsch, Verena Otter
45	*Stakeholder analysis of soil functions for BonaRes scenarios	Alevtina Evgrafova
46	Exploring the significance of subsoil for human well-being	Sophie Ittner et al.
47	Challenges and possible solutions for soil conserving application of organic fertilizer in spring	Sandra Ledermüller
48	Socio-Economic Assessment of Impacts of Cultivating Catch Crops on the Long-Term Profitability	Arnoud Maaswinkel
49	How much carbon uptake is feasible? A reality check for the 4per1000 initiative in Bavaria	Stefanie Mayer et al.
50	Rebound Effects in Agriculture	Carsten Paul et al.
51	Formal and Informal Learning about Soil Compaction	Karen Prilop

52	*Preferences of (sub-)alpine grassland ecosystem services: differences among and within stakeholder groups	Thomas Schmitt
53	Regulatory and Economic Instruments of Phosphorus Governance	Jessica Stubenrauch et al.
54	A scientific framework for CO2-certificates for soil organic carbon	Martin Wiesmeier et al.
55	Sustainability assessment of new management options to improve nutrient efficiency in soil	Jutta Will
56	*Why to look at phosphorus fertilization at the farm level?	Paul Winklhofer

TUESDAY, 18th February 2020

Morning Programme

09:00 – 10:00 **Keynote Lecture** (Hall 1AB)

Chair: Prof. Hans-Jörg Vogel

Title: Implications of interactions between roots and soil for the formation and function of the rhizosphere

Timothy George *(The James Hutton Institute, Dundee)*

Plants form the base of the terrestrial food chain and provide medicines, fuel, fibre and industrial materials to humans. Vascular land plants rely on their roots to acquire the water and mineral elements necessary for their survival in nature or their yield and nutritional quality in agriculture. Major biogeochemical fluxes of all elements occur through plant roots, and the roots of agricultural crops have a significant role to play in soil sustainability, carbon sequestration, reducing emissions of greenhouse gasses, and in preventing the eutrophication of water bodies associated with the application of mineral fertilisers.

This presentation provides a keynote perspective on the role of roots and rhizosphere in the battle to achieve global sustainability. It first examines how land plants and their roots evolved, describes how the ecology of roots and their rhizospheres contributes to the acquisition of soil resources, and discusses the influence of interactions between plant roots and rhizospheres on the formation of the rhizosphere and biogeochemical cycles. It then describes the role of roots in overcoming the constraints to crop production imposed by hostile or infertile soils, illustrates root ideotypes that improve the acquisition of mineral elements and water, and discusses high-throughput methods to screen for these traits in the laboratory, glasshouse and field. Finally, it considers whether knowledge of adaptations improving the acquisition of resources in natural environments can be used to develop rhizospheres for sustainable agriculture in the future.

10:00 – 10:30 **Coffee Break** (Foyer)

10:30 – 11:30 **Highlight Presentation BonaRes Projects 2** (Hall 1AB)

Chair: Prof. Hans-Jörg Vogel

10:30 – 10:50 InnoSoilPhos: Redox-induced mobilization and speciation of phosphorus in arable soils
Dr. Karen Baumann (University of Rostock)

10:50 – 11:10 SOILAssist: SOILAssist - toolbox for implementing and managing soil-conserving traffic on crop land
Dr. Marco Lorenz (The Johann Heinrich von Thünen-Institute, Braunschweig)

11:10 – 11:30 CATCHY: Nutrient management in catch crop systems
Dr. Norman Gentsch (University of Hannover)

11:30 – 12:00 **Poster Elevator Pitches 2** (Hall 1AB) – see Tuesday's poster list below for details

Chair: Dr. Stephan Bartke

Impact of cropping systems on soil functions: Katja Augustin, Bibiana Betancur-Corredor, Lukas Beule, Rowena Gerjets, Julien Guigue, Catherine W. Kamau, Deepanshu Khare, Narges Moradtalab, Julien Roy, Loreen Sommermann

Advanced Sensing and data processing in soil science: Frauke Lindenstruth, Justus van Ramshorst, Martin Maiwald, Anne Schucknecht, Kay Sowoidnich, Bernd Sumpf, Thomas Wiemann

Infrastructures for soil research data: Carolina Cardoso Lisboa, Meike Grosse

Modeling soil functions: Michael Kuhwald, Ulrich Weller

12:00 – 12:15 **Group Picture** (Foyer)

12:15 – 13:30 **Lunch Break** (Foyer)

Afternoon Programme

13:30 – 15:00 **Poster Session 2** (Foyer) – see Tuesday's poster list below for details

15:00 – 16:20 **Highlight Presentation BonaRes Projects 3** (Hall 1AB)
Chair: Dr. Einar Eberhardt

15:00 – 15:20 ORDIAmur: Reduced potential for the degradation of phenolic compounds in the rhizosphere of apples plants grown in replant soils
Dr. Viviane Radl (Helmholtz Zentrum München)

15:20 – 15:40 Inplamint: Effect of C:N:P stoichiometry on plant-soil-microorganism interactions
Dr. Nicolas Brüggemann (Forschungszentrum Juelich GmbH)

15:40 – 16:00 I4S: Highlights from research on sensor-based management of in-field soil variability*Dr. Robin Gebbers (Leibniz-Institut für Agrartechnik und Bioökonomie e.V)*

16:00 – 16:20 BonaRes Zentrum: Modeling soil functions in agricultural systems – the Bodium approach
Dr. Sara König (Helmholtz Centre for Environmental Research – UFZ)

Short Break (Hall 1AB)

16:45 – 17:45 **Short Presentation Rhizosphere Projects** (Hall 1AB)
Chair: Prof. Dr. Doris Vetterlein

16:45 – 16:55 RootWays: Deep-rooting cover crop mixtures: Creating highways to subsoil water and nutrient resources
Prof. Dr. Sandra Spielvogel (Christian Albrechts University Kiel)

16:55 – 17:05 RhizoTraits: Rhizosphere traits enhancing yield resilience to drought in modern cropping systems
Jun.-Prof. Dr. Johanna Pausch (University of Bayreuth)

17:05 – 17:15 Bread And Beer: Production of wheat and barley under reduced input in organic farming
Prof. Dr. Sylvia Schnell (Justus Liebig University Giessen)

17:15 – 17:25 µPlastic: Understanding and mitigating microplastic effects on rhizosphere processes and interactions in agricultural soils
Dr. Moises Sosa-Hernandez (Berlin)

17:25 – 17:35 CROP: Combining ROot contrasted Phenotypes for more resilient agro-ecosystem
Prof. DR, Guillaume Lobet (Jülich)

17:35 – 17:45 RhizoWheat: Rhizosphere processes and yield decline in wheat crop rotations
Prof. DR. Kage (Kiel)

17:45 – 18:00 **Wrap-up, Early Career Award Ceremony & Closing remarks** (Hall 1AB)

18:00 – 18:45 **Meeting Coordinators, Reviewers, IAB, BMBF/PtJ** (Hall 2AB)

19:30 **Conference Dinner** (Ratskeller, Leipzig – Please make sure you bring the vouchers)
https://www.ratskeller-leipzig.de/

Posters Tuesday, 18th February 2020

*Participant BonaRes Early Career Award

Impact of cropping systems on soil functions		
1	Comparison of traffic intensities for a crop rotation with sugar beet, maize and winter wheat	Katja Augustin
2	Effect of long-term agricultural practices on the performance of field-grown crops and soil prokaryotic communities	Behr J. H. et al.
3	*Soil fauna and its relationship with nitrogen	Bibiana Betancur-Corredor et al.
4	*Diversification through agroforestry: consequences for soil microorganisms and crop health	Lukas Beule et al.
5	Biotic and abiotic controls on carbon storage in aggregates from grassland soils in the Northern Limestone Alps of Germany	Noelia Garcia-Franco et al.
6	*Soil hydrolocial processes in a temperate agroforestry system	Rowena Gerjets et al.
7	How subsoil management can impact C stocks in agroecosystems: application of hyperspectral imaging to quantify changes in C stocks in the top one meter of soil	Julien Guigue
8	*Crop rotation and addition of high carbon amendments differentially impact rhizosphere bacterial communities	Catherine W. Kamau et al.
9	The contribution of free-living nematodes together with associated microbes in apple replant disease	Xorla Kanfra, Holger Heuer
10	*Quantifying how plants with different species-specific water-use strategies cope with the same drought-prone hydro-ecological conditions	Deepanshu Khare et al.
11	Production and exudation of phytoalexins	Benye Liu
12	Effects of agroforestry systems on microclimate and water availability as determinants for sustainable soil productivity	Marie Majaura et al.
13	Control of physical and chemical soil properties to mitigate apple replant disease	Nele Meyer et al.
14	Impact of Apple replant disease (ARD) on soil mesofauna biodiversity and density	Julia Michaelis, Rainer Meyhöfer
15	*Root development and exudation of wheat plants collected from root windows installed in the filed with different soil management	Narges Moradtalab
16	Influence of the crop-detritusphere-maize rhizosphere interactions on the dynamics of microbial communities and their functions	Jochen Müller, Nico Jehmlich
17	Changes in bacterial and fungal populations during plant litter decomposition	Michal Oskiera et al.
18	The phylogenetic depth of the effect of agriculture on mycorrhizal and protistan diversity	Julien Roy et al.
19	High wheel loads and multiple wheel passes: both affecting soil properties	Maike Siekmann
20	Effects of precrops on the performance of winter wheat and soil microbial communities	Loreen Sommermann et al.
21	Vegetative and biochemical reactions as indicators of tolerant rootstock genotypes of Malus against ARD	Jannika Staudt
22	Effect of serradella (Ornithopus sativus) on mycorrhiza formation in a crop rotation	Nora Vitow et al.
23	* Root characteristics and physiological health indicators of winter wheat as affected by pre-crops, tillage-, and fertilization-intensity	Saskia Windisch
24	Cover crop carbon allocation: 3D upscaling of carbon composition, key pore properties and depth distribution	Iris Zimmermann et al.

Advanced Sensing and data processing in soil science		
25	Low cost optical methode for nitrate sensing in soil	Mohamed Bourouah et al.
26	Investigation of the mass contents of P(total) and P(plant available) with ICP-OES and XRF - correlation, its relevance and uncertainty	Romina Eggers et al.
27	Data-driven assistance for soil protection during harvesting	Santiago Focke Martinez
28	Assessment of Soil-Borne Causes of Biomass Variability in Grassland with Mobile Sensing Systems	Robin Gebbers
29	Towards field application of mid-infrared spectroscopy: Attenuated total reflection versus diffuse reflectance spectroscopy	Matthias Leenen et al.
30	*UAV image analysis of crop signals: an opportunity to detect soil compation?	Frauke Lindenstruth
31	Tire deflection: The way to spatial distribution of dynamic soil loads (Author: Marco Lorenz, Joachim Brunotte, Thünen-Institut für Agrartechnologie, Braunschweig)	Marco Lorenz, Joachim Brunotte
32	THz Spectroscopy for Soil Analysis	Benjamin Mahns
33	Shifted Excitation Raman Difference Spectroscopy for Soil Analysis	Martin Maiwald, Kay Sowoidnich, Bernd Sumpf
34	Proximal gamma-ray spectrometry as a tool to support plot experiments	Stefan Pätzold et al.
35	Estimating biomass and plant nitrogen content of (pre-)Alpine grasslands with multispectral UAS data	Anne Schucknecht et al.
36	*Atmospheric processes informing sustainable soil management	Justus van Ramshorst et al.
37	Assessment of Spatial Variability in Silvoarable Agroforestry Systems Through Drone-Based Remote Sensing	Matthias Wengert et al.
38	Hyperspectral Point Clouds for Semantic Interpretation of Cultivated Areas	Thomas Wiemann
39	Quantifizierung der maximalen Anpassungsgüte von Sensormessungen	Jakob Zabel et al.
40	*Soil Nutrient Detection for Precision Agriculture Using Handheld Laser-Induced Breakdown Spectroscopy (LIBS) and Multivariate Regression Methods (PLSR, Lasso and GPR)	Martin Zühlke et al.
41	Identification of genetic factors influencing replant disease in apple	Stefanie Reim et al.
41a	Moving Fields: Hightech - Pflanzenzüchtung für Energie- und Klimaschutz	Sebastian Wolfrum

Infrastructures for soil research data		
42	The Global Long-Term Agricultural Experiment Network	Carolina Cardoso Lisboa
43	Plausibility check for soil description data	Einar Eberhardt
44	*BonaRes database scheme for long-term field experiments	Meike Grosse et al.
45	The BonaRes Repository - an infrastructure for soil research data	Xenia Specka et al.
46	The BonaRes Data Centre – research data management services	Nikolai Svoboda

Modeling soil functions		
47	Water, C and N turnover in a 40 year field trial with different N fertilisers and fertiliser levels using the DAISY model	Kurt Heil, Urs Schmidhalter
48	Assessing slow and fast cycling SOM pools by particle-size	Christopher Just et al.

	fractionation - A perspective of modelling SOC sequestration potentials	
49	Simulation of grassland soil functions and visualization by a traffic light approach for farmers	Ralf Kiese et al.
50	Biology in process modelling	Sara König
51	Evaluating soil compaction risk at very high spatial resolution	Michael Kuhwald
52	Applying machine learning and differential evolution optimisation for soil texture predictions at national scale (Germany)	Mareike Ließ et al.
53	From machine data to soil functions: Real time tracking of soil load from top to subsoil	Marco Lorenz
54	Modelling Agro-Forestry Systems	Eckart Priesack et al.
55	Methodological aspects concerning regionalisation of soil modelling results	Karin Schmelmer, Einar Eberhardt
56	Validation of a CART and MLR analysis for the estimation of yield response to P-fertilization	Kristin Steinfurth, Uwe Buczko
57	The Bodium Model	Ulrich Weller

Rhizosphere funding initiative		
57	Influence of the crop-detritusphere-maize rhizosphere interactions on the dynamics of microbial communities and their functions	Jochen Müller, Nico Jehmlich
58	Cover crop root channels as a management strategy for improved access to nutrient and water of subsoils	Tobias Stürzebecher et al.
59	Cover crop carbon allocation: 3D upscaling of carbon composition, key pore properties and depth distribution	Iris Zimmermann et al.
60	Trait-based modeling of microbial C cycling in the rhizosphere	Holger Pagel

WEDNESDAY, 19th February 2020
Morning Programme

08:30 – 12:00 **Thematic Workshops**

1. From Processes to Prediction (Hall 1C)
Organizers: Sara König, Ulrich Weller
Process understanding as it is generated in the various BonaRes research projects should ultimately allow to predict the impact of soil management on soil productivity and other soil functions. This requires the translation of process understanding into model concepts. Also shaping scientific findings into model descriptions helps to identify knowledge gaps for further research. In BonaRes there are several modeling activities, both in the various projects and in the BonaRes Centre addressing a wide range of soil processes. Our aim is to discuss possibilities to integrate new research findings into the different model frameworks. Based on the composition of the group we will organize theme tables that will treat specific questions on a variety of topics. Different groups can be adapted according to the interests of the participants (suggestions are welcome):

- Feedbacks between management, subsurface biodiversity and soil functions
- Direct and indirect changes in soil structure in response to tillage
- Impact of soil management on nutrient cycles
- Phosphor dynamics

The final synthesis will provide the roadmap for further integration of the studied processes into the different modelling activities.

2. Synthesis Workshop on Management Recommendations (Hall 2A)
Organizer: N. Brüggemann/S. Bauke
The projects of the BonaRes funding initiative work towards improving the sustainable use of soils in agricultural management, with each project focusing on a very specific management strategy. As a result, a range of management tools, e.g., tillage, catch cropping, fertilization, or incorporation of organic soil amendments, are tested in several projects in parallel. While each project will interpret observed effects with respect to the specific project goals, we suggest that we may benefit from the fact that experiments are scattered across Germany with varying soils and climatic conditions as well as different experimental approaches. We propose that the numerous results already generated within the projects can be accumulated into a synthesis of recommendations for sustainable agricultural management in Germany. This workshop is intended to bring together participants from all BonaRes projects and to provide a first overview of which management tools can be compared across projects and which complementary or contradictory effects have been observed so far.

3. Defining criteria for sustainable soil management (Hall 2B)
Organizer: BonaRes Assessment & Governance-Group
The BonaRes initiative has completed the first half of its intended funding period and an impressive wealth of scientific knowledge has been generated. In addition to scientific publications, this knowledge should also be utilized in practical applications. Our workshop is intended to facilitate such a transfer by defining criteria for

sustainable soil management. As a real-life case we will address the start-up company landaio (landaio.com), which is offering crowdfunded financial services for farmers to help them acquire land. A central motivation for their crowdfunders is the intention to support more sustainable agricultural practices. This approach, like any approach to foster sustainability in agriculture, requires criteria for sustainable soil management. In this workshop, we will develop some recommendations and prepare the stage for further dialogue.

4. Pedometry and Advanced Sensing - Data Analysis and Measurement Methods in Soil Science (Hall 1D)

Organizer: Robin Gebbers, Marco Lorenz

In each BonaRes project, data analysis and measurement methods are used to study physical, chemical and biological soil properties. A methodological workshop can therefore contribute to the cross-fertilisation of the projects. The following aspects will be covered in the workshop:

- New data analysis methods for the evaluation of soil-related data.
- Data fusion: linking of soil-related data with different variables, different accuracy, different spatial/temporal resolution, different support, exchange formats.
- Use of freely available data (e.g. Sentinel, SoilGrids, OpenLandMap)
- New and further developed measuring methods on terrestrial and airborne platforms: e.g. hyperspectral measurement systems from x-rays to THz, 3D laser scanning, potentiometry, compaction
- Sensor comparison: Comparison of (potential) in-situ and short-range sensors for time- and cost- efficient soil investigation.

5a) R-WS for beginners - basic data handling (Hall 1A)

Organizers: Jessica Clayton, Julia Michaelis, Steffen Rothardt

This workshop will provide a starting point for people who have no or little experience with R but are motivated to make the leap. You will firstly learn how to import raw data into R and check the quality of the data (e.g. remove outliers and correct typos). You will then learn some basic functions to handle your data, such as performing simple calculations, creating new columns and summary tables, and structure your data so that it is ready for making plots and calculating basic statistics within R (Wednesday afternoon workshop). You will need to bring a laptop with R and Rstudio installed.

5b) R-WS Advanced statistics: Data evaluation LMMs (Hall 1B)

Organizers: Norman Gentsch, Marcus Schmidt

Complex field designs and environmental parameters can affect the results of scientific experiments. If there are confounding effects (i.e., samples derived from different sampling sites, at different times or with differing soil properties), simple linear models such as analyses of variances (ANOVA) have limitations. Linear mixed models (LMMs) allow both fixed and random effects in order to account for nested data or changing environmental parameters. The workshop will shortly introduce the theory of LMMs and provide illustrative and reproducible examples. Participants should have basic R knowledge and should be familiar with transferring data into Rstudio and with the application of linear models, such as ANOVA. Please install RStudio with the desired packages (lme4, emmeans, multcomp, MuMin, ggplot2 and xlsx) prior the workshop.

12:00 – 13:30 **Lunch Break** (Foyer)

Afternoon Programme

13:30 – 17:00 **BonaRes Data Workshop** (Hall 1C)
Organizers: NN
On Wednesday afternoon you have the opportunity to participate in a BonaRes Data Workshop organized by the BonaRes Data Centre. The workshop is addresses interested scientists who have already transferred research data to the Data Centre or who plan to do so in the near future. The focus will be on the upload of data to the Data Centre and the subsequent description with metadata. We will also describe the way to obtain a Digital Object Identifier (DOI) for your data. The objective is to establish a trouble-free workflow for data provision and to get to know the "metadata editor" for the standardized description of your research data.

5c) R-WS Basic statistics and visualization (Hall 1A)
Organizers: Birgit Lang, Bernd Berauer, David-Paul Klein, Sara König, Nilupuli Thushangi Wadu Thanthri
R is a powerful programming language for analysis and graphics, but can be a bit overwhelming for beginners. In this workshop, you will learn how to do i) descriptive statistics and data exploration (e.g. histograms; normality tests; calculation of mean, median and standard deviation), ii) basic statistics (e.g. anova; linear regression) and iii) the first steps of data visualization using basic R functions and the ggplot2 package (e.g. boxplot; scatterplot; regression lines; simple graphics design). Data and code will be provided. Participants should have basic experience with R (e.g. from R for bloody beginners workshop in the morning) and bring their own laptop with RStudio installed. A list of packages to install will be given prior to the workshop.

5d) R-WS Advanced data handling and visualization (Hall 1B)
Organizers: Bernd Berauer, Sara König, Jessica Clayton, Birgit Lang
As the pure amount of data increases, handling and visualization of such “big data” are important skills for scientists. For both, the workflow can be facilitated by automation. This workshop will give some guidance on advanced i) managing & juggling of data ii) visualization beyond basics including insets of graphs & stats iii) a quick introduction on how to automatize work (e.g. importing multiple datasets, using loops and functions to make multiple graphs). We will work with R-packages such as dplyr, tidyr, purrr and ggplot2 (and associated plotting packages) to show possibilities and alternatives. Some basic data and code will be provided but this workshop will also allow time for working on your own data and data-problems. You should be familiar with R (basic to intermediate experience) and have the data in an R ready/readable format on your own functioning laptop.

13:30 **Infomeeting for the Rhizosphere Projects** (Hall 2B)

13:30 – open **Internal Project Meetings**
SOILAssist (Tagungsbüro 131/KUBUS)
I4S (Hall 2A/KUBUS)
Soil³ (Hall 1D/KUBUS)
CATCHY (Presseraum 219/KUBUS)
Inplamint (Raum 113/Geb. 4.1)
InnoSoilPhos (VTS/Geb. 1.0)
ODIAmur (Raum 101/Geb. 4.0.)

INSTRUCTIONS FOR AUTHORS

Highlight Presentations BonaRes Projects

Highlight presentations will be 20 min (15 min + 5 min discussion). Presentation format can be Power Point or pdf. Both, 4:3 and 16:9 presentation formats are possible. Please bring your presentation on a USB-stick and upload it timely before the start of your session.

Poster Elevator Pitches

A poster elevator pitch is a quick one-minute advertising introduction to a poster that is shown later in the poster session. For your elevator pitch, please prepare one slide in Power Point or pdf format to visualize the main content of your poster. Both, 4:3 and 16:9 presentation formats are possible. Please bring your presentation on a USB-stick and upload it timely before the start of the highlight presentations session preceding your poster elevator pitch session (there will be no break between highlight presentations and poster elevator pitches).

Poster Sessions

There will be two poster sessions during the Status Seminar. The poster format is DIN A0, portrait. Feel free to additionally bring DIN A4 handouts of your poster or handouts of related publications. Posters of early career scientists participating in the early career poster award will be marked accordingly. Please remove your posters at the end of the day, so we can use the poster boards for the poster session on the following day.

BonaRes Conference Booth

We will set up the BonaRes conference booth in the Foyer of the KUBUS where flyers, BonaRes Series publications and other information material will be available. Please feel free to bring further information material from your project and add it to the booth. There will also be online presentations of the BonaRes Portal, the Data Portal and the LTFE online map.

Venue: KUBUS at Helmholtz Centre for Environmental Research – UFZ Leipzig
Permoserstraße 15
04318 Leipzig

Travelling by car

- coming from motorway A14 take exit "Leipzig-Ost" and head towards Leipzig Stadtzentrum/City Centre; continue on Permoserstrasse up to the underground parking sign for conference Leipziger KUBUS on the right

Travelling by rail

- coming from Leipzig's central station, take tramline 3 or 3E towards "Taucha" or “Sommerfeld” and get off at "Permoserstraße/Torgauer Straße" (about 12 min, 7th stop)

Venue: Restaurant “Ratskeller”
Lotterstraße 1
04109 Leipzig

Travelling by tram

- coming from the KUBUS, take tramline 3 towards "Knautkleeberg" and get off at Leipzig Central Station. Have a short walk through Leipzig’s city centre where you can pass the Nikolaikirche, Auerbach’s Keller and the Thomaskirche.
  You will also have the opportunity to have a quick stop at motel one Nikolaikirche or Intercity Hotel.